

## Trend Study 2-16-01

Study site name: Garden City Canyon.

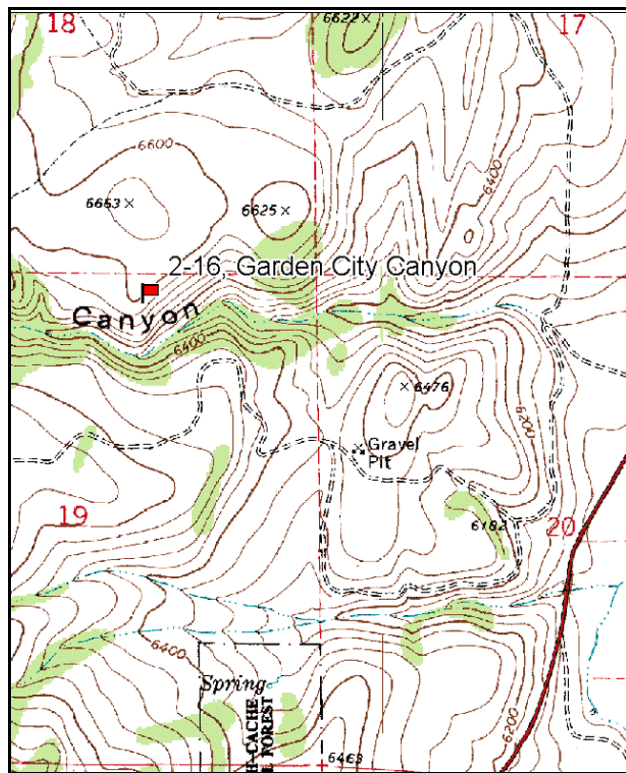
Vegetation type: Curlleaf Mahogany.

Compass bearing: frequency baseline 166 degrees magnetic.

Frequency belt placement: line 1 (11 & 95ft), line 2 (59ft), line 3 (34ft), line 4 (71ft).

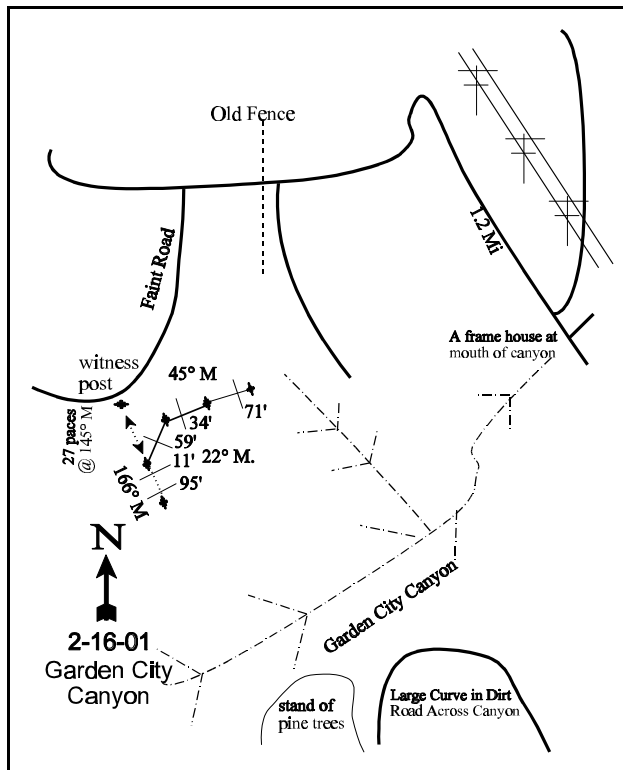
### LOCATION DESCRIPTION

From Garden City, proceed west on US-89. Turn right at 525 W. Proceed 0.25 miles and turn right. Stay left and continue for 1.2 miles to a fence with a gate. Follow a faint road to the left, it may eventually be impassable. From here walk down the road to a witness post on the edge of the canyon. From the witness post walk 27 paces at 145 degrees magnetic to the 0-foot stake of the baseline. The 0-foot stake is marked by browse tag #7936. Azimuth of the baseline is 166 degrees magnetic. Line 2 runs 22 degrees magnetic. Lines 3 and 4 run 45 degrees magnetic.



Map Name: Garden City

Township 14N, Range 5E, Section 19



Diagrammatic Sketch

UTM 4644019 N, 464684 E

## DISCUSSION

### Trend Study No. 2-16

The Garden City Canyon study samples winter range on the north rim of Garden City Canyon in Rich County. The study site is found on a moderately steep (45%), south to southeast-facing slope with an elevation of 6,580 feet. The vegetational type is characterized by curlleaf mountain mahogany with an associated mixture of mountain brush. The site is heavily used by deer and elk. It is typical of the small mahogany knolls and hillsides so common in this area. More level sites adjacent to the knolls support vigorous stands of mountain big sagebrush and bitterbrush. However, big game seem to prefer the more exposed and less densely vegetated knolls and hillsides. Pellet group data also shows a moderately high number of elk utilize the site. Pellet group transect data from the site estimated 55 deer and 16 elk days use/acre in 2001 (136 ddu/ha and 40 edu/ha). All of the elk and about 60% of the deer pellet groups were from winter use, while about 40% of the deer pellet groups were more recent (late spring/early summer).

Soil is classified as "Foxol Very Stony Loam", a soil series that occurs on moderately steep slopes. Foxol soil is shallow, slightly acidic, moderately permeable, and excessively drained. Soil parent material is quartzite and depth to bedrock is normally about 15 inches (Campbell and Lacey 1982). Soil on the site has a clay loam texture with an effective rooting depth (see methods) estimated at only 9 inches in 1996. The soil reaction is moderately acidic (pH of 5.8). The surface is exceptionally rocky with many large boulders and exposed bedrock. In spite of these characteristics, there is relatively little erosion. Cover from vegetation, litter, and rock is abundant, leaving little unprotected soil. The soil erosion condition class was determined to be stable in 2001.

Browse composition is highly variable which makes designating a single key species difficult. The most conspicuous shrub, although not the most numerous, is curlleaf mountain mahogany. Many of the mahogany are large and tree-like in stature. Estimates from the shrub density strips indicated a population of 280 plants/acre in 1996 and 220 plants/acre in 2001. A majority of the mahogany are mature plants which are highlined and mostly unavailable to further browsing. The average height of all available mature plants was estimated at nearly 4 feet in 2001. Overhead canopy cover of mahogany is highly variable but averages about 16%. Most of the tall mahogany have been highlined and utilization of available plants is moderate to heavy. Vigor is normal for most individuals and percent decadency was moderate at 21% in 1996, increasing to 36% by 2001.

Other important browse on the site include a combination of low sagebrush and mountain big sagebrush, bitterbrush and serviceberry. Low sagebrush (*Artemisia arbuscula*) is much more abundant and widespread. It accounted for 50% of the understory shrub cover in 1996 with an estimated density of 2,600 plants/acre. In 2001, it provided 44% of the understory shrub cover. Utilization was heavy in 1984, but light to moderate use has occurred since then. The percentage of plants showing poor vigor has declined since 1984 and 1990. Percent decadence declined until 1996, then rebounded to 20% in 2001.

Bitterbrush is not abundant with density being estimated at just over 100 plants/acre. They display heavy use, but have good vigor and low decadence. Serviceberry has also been heavily browsed in the past, but current use is classified as light to moderate. Density is low at around 200 plants/acre. Mature plants are stunted and measure only about 2 feet in height. Percent decadence has improved from 67% in 1990 to 10% in 2001. Vigor is currently normal on all plants sampled.

The herbaceous understory consisted primarily of perennial grasses in 1984. Most important were bluebunch wheatgrass followed by Sandberg bluegrass and Kentucky bluegrass. Annual grasses, especially cheatgrass brome, occurred only in scattered patches. By 1996, cheatgrass is by far the most numerous herbaceous species on the site. Cheatgrass, along with Japanese brome accounted for 66% of the grass cover. It was reported in 1996 that about half of the brome grasses were infected with smut. Bluebunch wheatgrass remained the most abundant perennial grass with Sandberg bluegrass also being fairly abundant. Prairie Junegrass, mutton bluegrass, and Kentucky bluegrass were not found in the surveys of 1990 or 1996. During the 2001 reading, cheatgrass declined significantly in frequency and cover similar to other trend studies in unit 2. The dominant perennial species, bluebunch wheatgrass, remained stable while Sandberg bluegrass increased significantly.

Forbs are a minor component. Composition includes relatively few species of high or even medium palatability. All perennial forbs combined produce less than 2% cover. It is possible that the shallow and excessively drained soil is not conducive to a productive forb component.

#### 1984 APPARENT TREND ASSESSMENT

Most of the measured trend indicators suggest stable soil and vegetative trends. Although soil is shallow and rocky, there is no evidence of significant erosion problems. Vegetatively, the area should continue to possess a strong grass understory and a mixed stand of browse with curleaf mountain mahogany as the dominant species.

#### 1990 TREND ASSESSMENT

This study site is representative of curleaf mountain mahogany winter range on south-facing slopes and ridge tops along the eastern side of the herd unit. Snow limits use in some winters, but the area is frequented by deer, elk, and moose. Within the diverse browse community, only curleaf mountain mahogany is heavily to severely hedged. This is not unusual as it is the most preferred browse. The bulk of the mahogany forage production is unavailable to most big game animals because of its height. Its population has increased slightly because of the young age class. The increased decadency should not be of concern because it is a long-lived species. It is not unusual to find individuals more than 300 years of age in most areas of Utah. Data for sagebrush shows a stable population of low sagebrush. The herbaceous understory remains dominated by bluebunch wheatgrass. Considering the steep slope and rockiness of the site, there is minimal erosion due to adequate litter and vegetative cover.

##### TREND ASSESSMENT

soil - stable (3)

browse - stable (3)

herbaceous understory - stable (3)

#### 1996 TREND ASSESSMENT

The soil trend is up slightly due to a slight increase in litter cover and a decline in bare ground. Trend for the key browse species, curleaf mountain mahogany, appears stable. The greatly increased sample size used this year may be partly responsible for the change in mahogany density. Mahogany on the site are very unevenly distributed. Utilization is more moderate on available plants and percent decadence slightly lower. Understory browse, serviceberry and low sagebrush display stable trends with lighter use and improved decadency rates. Bitterbrush is heavily utilized but maintains good vigor and low decadence. Overall, the browse trend appears stable. Trend for the herbaceous understory is stable. Sum of nested frequency for perennial grasses and forbs have remained similar to 1990. Since annuals were not included in the previous

readings, we do not know for sure if they have increased. However, the 1984 report states that cheatgrass occurred only in isolated patches. Currently, cheatgrass and Japanese brome are abundant and well dispersed. In addition, while perennial grass and forb sum of nested frequency values remained unchanged since 1990, percent litter cover increased with percent bare ground declining. This may be the result of an increase in annual cheatgrass.

#### TREND ASSESSMENT

soil - up slightly (4)

browse - stable (3)

herbaceous understory - stable but dominated by cheatgrass (3)

#### 2001 TREND ASSESSMENT

Trend for soil is slightly down due to an increase in bare ground and a decline in litter and vegetation cover. Since 1996, grass cover has declined from 31% to 18%. This decline is due entirely to a significant decline in the frequency and cover of cheatgrass which provided 66% of the grass cover in 1996, but only 13% in 2001. The change is likely due to the timing of precipitation this season. As a result of the decline in vegetation and litter cover, the ratio of protective ground cover to bare soil has dropped by 45%. Erosion is still minimal and the erosion condition class was determined as stable in 2001. Trend for browse is slightly down for the key species, curlleaf mountain mahogany. Utilization is heavy on available portions, vigor is poor on 18% of the plants sampled, and percent decadence has increased from 21% in 1996 to 36% in 2001. In addition, half of the 80 decadent plants/acre were classified as dying (>50% crown dead). Reproduction has been very poor since 1996 and the current number of young plants estimated in the population is not currently enough to maintain the population. However, these are long lived shrubs and a return to normal precipitation patterns may help reverse this trend. The secondary browse species, serviceberry, low sagebrush, and bitterbrush appear to have stable populations. Since the majority of the available browse forage comes from these understory shrubs, overall trend for browse is considered stable. Trend for the herbaceous understory is up slightly. Sum of nested frequency for the Sandberg bluegrass increased significantly whereas bluebunch wheatgrass remained stable. The most notable change was the significant decline in the nested frequency of cheatgrass. It also declined substantially in cover from 19% to only 2%. Perennial forbs are still uncommon and produce little forage.

#### TREND ASSESSMENT

soil - down slightly (2)

browse - slightly down for curlleaf mahogany but stable overall (3)

herbaceous understory - up slightly (4)

HERBACEOUS TRENDS --  
Herd unit 02 , Study no: 16

Type	Species	Nested Frequency				Quadrat Frequency				Average Cover %	
		'84	'90	'96	'01	'84	'90	'96	'01	'96	'01
G	Agropyron spicatum	157	167	165	176	61	60	64	62	7.06	8.40
G	Bromus japonicus (a)	-	-	<sub>b</sub> 55	<sub>a</sub> 24	-	-	17	11	1.23	.10
G	Bromus tectorum (a)	-	-	<sub>b</sub> 341	<sub>a</sub> 142	-	-	98	55	18.94	2.33
G	Koeleria cristata	7	-	-	3	4	-	-	1	-	.03
G	Poa fendleriana	3	-	-	-	1	-	-	-	-	-
G	Poa pratensis	25	-	-	-	12	-	-	-	-	-
G	Poa secunda	<sub>a</sub> 44	<sub>b</sub> 131	<sub>b</sub> 137	<sub>c</sub> 226	22	51	53	79	3.46	7.52
G	Sitanion hystrix	-	-	1	-	-	-	1	-	.03	-
G	Stipa lettermani	-	-	-	1	-	-	-	1	-	.03
Total for Annual Grasses		0	0	396	166	0	0	115	66	20.17	2.44
Total for Perennial Grasses		236	298	303	406	100	111	118	143	10.55	15.98
Total for Grasses		236	298	699	572	100	111	233	209	30.72	18.43
F	Agoseris glauca	4	1	4	13	2	1	1	5	.00	.07
F	Alyssum alyssoides (a)	-	-	122	150	-	-	43	56	.56	.67
F	Arabis spp.	-	3	4	4	-	1	3	2	.04	.01
F	Artemisia ludoviciana	1	-	-	-	1	-	-	-	-	-
F	Balsamorhiza sagittata	-	-	-	-	-	-	-	-	-	.03
F	Camelina microcarpa (a)	-	-	3	6	-	-	1	4	.00	.07
F	Calochortus nuttallii	-	6	-	-	-	2	-	-	-	-
F	Cirsium undulatum	7	7	11	5	4	4	5	4	.28	.36
F	Collomia linearis (a)	-	-	-	3	-	-	-	1	-	.03
F	Comandra pallida	19	24	24	24	9	10	10	14	.15	.33
F	Collinsia parviflora (a)	-	-	<sub>a</sub> 4	<sub>b</sub> 135	-	-	2	55	.01	.42
F	Crepis acuminata	<sub>a</sub> -	<sub>a</sub> 1	<sub>ab</sub> 7	<sub>b</sub> 18	-	1	3	8	.24	.72
F	Descurainia pinnata (a)	-	-	-	3	-	-	-	3	-	.01
F	Draba verna (a)	-	-	<sub>a</sub> -	<sub>b</sub> 15	-	-	-	5	-	.07
F	Epilobium brachycarpum (a)	-	-	<sub>b</sub> 48	<sub>a</sub> 29	-	-	21	13	.28	.14
F	Erodium cicutarium (a)	-	-	-	8	-	-	-	3	-	.09
F	Erigeron divergens	-	1	-	-	-	1	-	-	-	-
F	Eriogonum umbellatum	-	-	-	-	-	-	-	-	-	.00
F	Gayophytum ramosissimum (a)	-	-	1	-	-	-	1	-	.00	-
F	Holosteum umbellatum (a)	-	-	-	1	-	-	-	1	-	.00
F	Lappula occidentalis (a)	-	-	2	1	-	-	1	1	.00	.00
F	Microsteris gracilis (a)	-	-	<sub>a</sub> -	<sub>b</sub> 64	-	-	-	26	-	.22

T y p e	Species	Nested Frequency				Quadrat Frequency				Average Cover %	
		'84	'90	'96	'01	'84	'90	'96	'01	'96	'01
F	Pellaea breweri	5	-	-	-	3	-	-	-	-	-
F	Penstemon spp.	-	1	-	-	-	1	-	-	-	-
F	Petradoria pumila	-	-	1	-	-	-	1	-	.03	.03
F	Phlox longifolia	-	2	-	1	-	1	-	1	-	.00
F	Polygonum douglasii (a)	-	-	3	2	-	-	1	2	.00	.01
F	Sisymbrium altissimum (a)	-	-	3	-	-	-	1	-	.03	.03
F	Tragopogon dubius	<sub>b</sub> 15	<sub>a</sub> 4	<sub>a</sub> 6	<sub>ab</sub> 8	9	2	2	3	.01	.06
F	Wyethia amplexicaulis	1	3	3	-	1	1	1	-	.03	-
Total for Annual Forbs		0	0	186	417	0	0	71	170	0.89	1.80
Total for Perennial Forbs		52	53	60	73	29	25	26	37	0.78	1.65
Total for Forbs		52	53	246	490	29	25	97	207	1.68	3.46

Values with different subscript letters are significantly different at alpha = 0.10 (annuals excluded)

#### BROWSE TRENDS --

Herd unit 02 , Study no: 16

T y p e	Species	Strip Frequency		Average Cover %	
		'96	'01	'96	'01
B	Amelanchier alnifolia	11	8	.41	.30
B	Artemisia arbuscula	56	54	7.85	8.18
B	Artemisia tridentata vaseyana	0	4	-	1.16
B	Cercocarpus ledifolius	14	10	3.65	1.72
B	Eriogonum heracleoides	2	2	-	-
B	Eriogonum microthecum	1	0	-	.15
B	Juniperus scopulorum	0	0	.88	1.02
B	Mahonia repens	7	10	.03	.48
B	Opuntia spp.	3	3	.18	.38
B	Pachistima myrsinites	3	4	.18	.18
B	Purshia tridentata	6	6	.71	1.64
B	Symphoricarpos oreophilus	16	16	1.72	3.23
Total for Browse		119	117	15.64	18.46

CANOPY COVER --

Herd unit 02 , Study no: 16

Species	Percent Cover	
	'96	'01
Cercocarpus ledifolius	13	16
Juniperus scopulorum	1.2	.60

BASIC COVER --

Herd unit 02 , Study no: 16

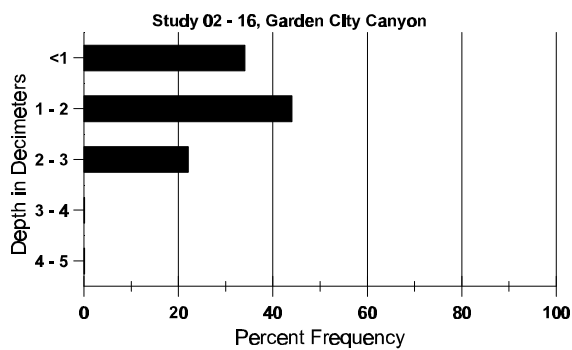
Cover Type	Nested Frequency		Average Cover %			
	'96	'01	'84	'90	'96	'01
Vegetation	377	334	2.25	10.25	50.30	37.32
Rock	260	250	33.75	28.00	20.68	22.32
Pavement	63	147	.50	.25	.58	3.29
Litter	387	373	58.75	55.00	56.87	44.82
Cryptogams	36	45	1.75	1.75	.48	.56
Bare Ground	85	144	3.00	4.75	2.30	8.35

SOIL ANALYSIS DATA --

Herd Unit 02, Study no: 16, Garden City Canyon

Effective rooting depth (in)	Temp °F (depth)	PH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
9.0	65.5 (9.0)	5.8	32.6	39.1	28.4	4.7	31.5	259.2	.4

## Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 02 , Study no: 16

Type	Quadrat Frequency		Pellet Transect	
	'96	'01	Pellet Groups per Acre	Days Use per Acre (ha)
			'01	'01
Rabbit	6	8	-	-
Elk	25	10	209	16 (40)
Deer	19	36	713	55 (136)

BROWSE CHARACTERISTICS --

Herd unit 02 , Study no: 16

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Amelanchier alnifolia																		
S	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	90	-	-	-	1	-	-	-	-	-	1	-	-	-	33		1	
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	84	7	-	-	-	-	-	-	-	-	7	-	-	-	233		7	
	90	1	1	-	1	-	-	-	-	-	-	3	-	-	100		3	
	96	2	-	-	-	-	-	-	-	-	1	1	-	-	40		2	
	01	1	3	-	1	-	-	-	-	-	5	-	-	-	100		5	
M	84	-	4	6	-	-	-	-	-	-	10	-	-	-	333	31	33	10
	90	-	-	1	-	-	1	-	-	-	1	1	-	-	66	35	25	2
	96	-	6	-	-	-	-	-	-	-	2	2	-	2	120	27	26	6
	01	-	3	1	-	-	-	-	-	-	3	1	-	-	80	26	28	4
D	84	-	2	1	-	-	-	-	-	-	3	-	-	-	100		3	
	90	2	3	4	-	1	-	-	-	-	2	5	-	3	333		10	
	96	2	1	-	-	-	-	-	-	-	-	1	-	2	60		3	
	01	-	-	1	-	-	-	-	-	-	1	-	-	-	20		1	
X	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	40		2	
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'84		30%			35%			00%			-25%							
'90		33%			40%			20%			-56%							
'96		64%			00%			36%			- 9%							
'01		60%			20%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'84	666	Dec:	15%			
												'90	499		67%			
												'96	220		27%			
												'01	200		10%			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Artemisia arbuscula																		
S	84	2	-	-	-	-	-	-	-	-	2	-	-	-	66		2	
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	84	1	2	-	-	-	-	-	-	-	3	-	-	-	100		3	
	90	3	1	-	1	-	-	-	-	-	5	-	-	-	166		5	
	96	6	1	-	-	-	-	-	-	-	7	-	-	-	140		7	
	01	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	84	-	24	7	-	-	-	-	-	-	24	-	7	-	1033	13 26	31	
	90	23	3	1	3	-	-	-	-	-	30	-	-	-	1000	17 16	30	
	96	89	20	-	-	-	-	-	-	-	109	-	-	-	2180	13 26	109	
	01	77	7	-	-	-	-	-	-	-	84	-	-	-	1680	13 29	84	
D	84	-	4	14	-	-	-	-	-	-	15	-	3	-	600		18	
	90	10	4	-	-	-	-	-	-	-	6	2	5	1	466		14	
	96	9	3	2	-	-	-	-	-	-	11	-	-	3	280		14	
	01	20	2	-	-	-	-	-	-	-	17	-	-	5	440		22	
X	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	580		29	
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	240		12	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'84		58%			40%			19%			- 6%							
'90		16%			02%			12%			+37%							
'96		18%			02%			02%			-17%							
'01		08%			00%			05%										
Total Plants/Acre (excluding Dead & Seedlings)												'84	1733	Dec:	35%			
												'90	1632		29%			
												'96	2600		11%			
												'01	2160		20%			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Artemisia tridentata vaseyana																		
M	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	01	4	-	-	-	-	-	-	-	-	-	4	-	-	-	80	20	29
D	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	01	1	-	-	-	-	-	-	-	-	-	1	-	-	-	20		
X	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'84		00%			00%			00%										
'90		00%			00%			00%										
'96		00%			00%			00%										
'01		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'84	0	Dec:	0%			
												'90	0		0%			
												'96	0		0%			
												'01	100		20%			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total																								
		1	2	3	4	5	6	7	8	9	1	2	3	4																												
Cercocarpus ledifolius																																										
S	84	4	-	-	-	-	-	-	-	-	4	-	-	-	133		4																									
	90	-	-	-	1	-	-	-	-	-	1	-	-	-	33		1																									
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0																									
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0																									
Y	84	1	-	-	-	-	-	-	-	-	1	-	-	-	33		1																									
	90	-	-	2	2	1	-	-	-	-	5	-	-	-	166		5																									
	96	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1																									
	01	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1																									
M	84	-	-	1	-	-	-	-	9	2	12	-	-	-	400	68 74	12																									
	90	-	-	-	-	-	-	6	1	-	7	-	-	-	233	183 83	7																									
	96	-	-	-	-	1	-	1	8	-	10	-	-	-	200	- -	10																									
	01	-	-	-	-	-	-	-	6	-	6	-	-	-	120	46 46	6																									
D	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0																									
	90	-	1	3	-	-	-	1	-	-	5	-	-	-	166		5																									
	96	-	-	1	1	-	1	-	-	-	3	-	-	-	60		3																									
	01	-	1	1	-	-	2	-	-	-	2	-	-	2	80		4																									
X	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0																									
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0																									
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	100		5																									
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	120		6																									
<table><tr><td>% Plants Showing</td><td><u>Moderate Use</u></td><td><u>Heavy Use</u></td><td><u>Poor Vigor</u></td><td><u>%Change</u></td></tr><tr><td>'84</td><td>00%</td><td>23%</td><td>00%</td><td>+23%</td></tr><tr><td>'90</td><td>12%</td><td>29%</td><td>00%</td><td>-50%</td></tr><tr><td>'96</td><td>07%</td><td>14%</td><td>00%</td><td>-21%</td></tr><tr><td>'01</td><td>09%</td><td>27%</td><td>18%</td><td></td></tr></table>																		% Plants Showing	<u>Moderate Use</u>	<u>Heavy Use</u>	<u>Poor Vigor</u>	<u>%Change</u>	'84	00%	23%	00%	+23%	'90	12%	29%	00%	-50%	'96	07%	14%	00%	-21%	'01	09%	27%	18%	
% Plants Showing	<u>Moderate Use</u>	<u>Heavy Use</u>	<u>Poor Vigor</u>	<u>%Change</u>																																						
'84	00%	23%	00%	+23%																																						
'90	12%	29%	00%	-50%																																						
'96	07%	14%	00%	-21%																																						
'01	09%	27%	18%																																							
Total Plants/Acre (excluding Dead & Seedlings)													'84	433	Dec:	0%																										
													'90	565		29%																										
													'96	280		21%																										
													'01	220		36%																										
Eriogonum heracleoides																																										
M	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0																									
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0																									
	96	2	-	-	-	-	-	-	-	-	2	-	-	-	40	-	2																									
	01	2	-	-	-	-	-	-	-	-	2	-	-	-	40	16 9	2																									
<table><tr><td>% Plants Showing</td><td><u>Moderate Use</u></td><td><u>Heavy Use</u></td><td><u>Poor Vigor</u></td><td><u>%Change</u></td></tr><tr><td>'84</td><td>00%</td><td>00%</td><td>00%</td><td></td></tr><tr><td>'90</td><td>00%</td><td>00%</td><td>00%</td><td></td></tr><tr><td>'96</td><td>00%</td><td>00%</td><td>00%</td><td>+ 0%</td></tr><tr><td>'01</td><td>00%</td><td>00%</td><td>00%</td><td></td></tr></table>																		% Plants Showing	<u>Moderate Use</u>	<u>Heavy Use</u>	<u>Poor Vigor</u>	<u>%Change</u>	'84	00%	00%	00%		'90	00%	00%	00%		'96	00%	00%	00%	+ 0%	'01	00%	00%	00%	
% Plants Showing	<u>Moderate Use</u>	<u>Heavy Use</u>	<u>Poor Vigor</u>	<u>%Change</u>																																						
'84	00%	00%	00%																																							
'90	00%	00%	00%																																							
'96	00%	00%	00%	+ 0%																																						
'01	00%	00%	00%																																							
Total Plants/Acre (excluding Dead & Seedlings)													'84	0	Dec:	-																										
													'90	0		-																										
													'96	40		-																										
													'01	40		-																										

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Eriogonum microthecum																		
M	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	1	-	-	-	-	-	-	-	-	-	1	-	-	20	10	26	1
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	0	12	22	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'84		00%			00%			00%										
'90		00%			00%			00%										
'96		00%			00%			00%										
'01		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'84	0	Dec:	-			
												'90	0		-			
												'96	20		-			
												'01	0		-			
Juniperus scopulorum																		
Y	84	1	-	-	-	-	-	-	-	-	1	-	-	-	33			1
	90	1	-	-	-	-	-	-	-	-	1	-	-	-	33			1
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	84	-	1	-	-	-	-	-	-	-	1	-	-	-	33	67	83	1
	90	-	-	-	1	-	-	-	-	-	1	-	-	-	33	118	98	1
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'84		50%			00%			00%			+ 0%							
'90		00%			00%			00%										
'96		00%			00%			00%										
'01		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'84	66	Dec:	-			
												'90	66		-			
												'96	0		-			
												'01	0		-			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Mahonia repens																		
S	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	90	6	-	-	-	-	-	-	-	-	-	6	-	-	200		6	
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	84	23	-	-	-	-	-	-	-	-	23	-	-	-	766		23	
	90	14	-	-	1	-	-	-	-	-	15	-	-	-	500		15	
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	84	51	-	-	-	-	-	-	-	-	51	-	-	-	1700	8	6	51
	90	105	4	-	4	-	-	-	-	-	113	-	-	-	3766	7	4	113
	96	39	-	-	-	-	-	1	-	-	40	-	-	-	800	4	6	40
	01	106	-	-	1	-	-	-	-	-	107	-	-	-	2140	3	4	107
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'84		00%			00%			00%			+42%							
'90		03%			00%			00%			-81%							
'96		00%			00%			00%			+63%							
'01		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'84	2466	Dec:	-			
												'90	4266		-			
												'96	800		-			
												'01	2140		-			
Opuntia spp.																		
Y	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	01	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	5	-	-	-	-	-	-	-	-	5	-	-	-	100	6	29	5
	01	7	-	-	-	-	-	-	-	-	7	-	-	-	140	5	15	7
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'84		00%			00%			00%										
'90		00%			00%			00%										
'96		00%			00%			00%			+38%							
'01		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'84	0	Dec:	-			
												'90	0		-			
												'96	100		-			
												'01	160		-			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Pachistima myrsinites																		
Y	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	96	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
	01	1	-	-	-	-	-	2	-	-	3	-	-	-	60		3	
M	84	1	-	-	-	-	-	-	-	-	1	-	-	-	33	6	7	
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	96	6	-	-	-	-	-	-	-	-	6	-	-	-	120	7	12	
	01	-	-	-	4	-	-	-	-	-	4	-	-	-	80	5	7	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'84		00%			00%			00%										
'90		00%			00%			00%										
'96		00%			00%			00%			-22%							
'01		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'84	33	Dec:	-			
												'90	0		-			
												'96	180		-			
												'01	140		-			
Purshia tridentata																		
Y	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	90	1	-	-	1	-	-	-	-	-	2	-	-	-	66		2	
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	90	-	-	1	-	-	-	-	-	-	1	-	-	-	33	24	33	
	96	-	3	3	-	-	-	-	-	-	6	-	-	-	120	16	36	
	01	2	2	1	-	1	-	-	-	-	6	-	-	-	120	18	40	
D	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	90	1	-	-	-	-	-	-	-	-	1	-	-	-	33		1	
	96	-	-	1	-	-	-	-	-	-	1	-	-	-	20		1	
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
X	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'84		00%			00%			00%										
'90		00%			25%			00%			+ 6%							
'96		43%			57%			00%			-14%							
'01		50%			17%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'84	0	Dec:	0%			
												'90	132		25%			
												'96	140		14%			
												'01	120		0%			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Symphoricarpos oreophilus																		
Y	84	1	-	-	-	-	-	-	-	-	1	-	-	-	33		1	
	90	1	-	-	-	-	-	-	-	-	1	-	-	-	33		1	
	96	5	-	-	-	-	-	-	-	-	4	-	1	-	100		5	
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	84	2	-	-	-	-	-	-	-	-	2	-	-	-	66	18	26	
	90	3	-	-	2	-	-	-	-	-	5	-	-	-	166	15	28	
	96	15	1	-	-	-	-	-	-	-	16	-	-	-	320	19	37	
	01	17	-	-	-	-	-	2	-	-	18	-	1	-	380	27	52	
D	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	96	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
	01	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'84		00%			00%			00%			+50%							
'90		00%			00%			00%			+57%							
'96		04%			00%			04%			-13%							
'01		00%			00%			05%										
Total Plants/Acre (excluding Dead & Seedlings)												'84	99	Dec:	0%			
												'90	199		0%			
												'96	460		9%			
												'01	400		5%			